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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,529	01/08/2002	Jay Rod Walton	PA010486	5530

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Qualcomm Incorporated
Patents Department
5775 Morehouse Drive
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EXAMINER	
HO, CHUONG T	
ART UNIT	**PAPER NUMBER**
2664	

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/042,529	WALTON ET AL.	
	Examiner	Art Unit	
	CHUONG T HO	2664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-65* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-65* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. The amendment filed 11/22/04 have been entered and made of record.

2. Claims 1-65 are pending.

DETAILED ACTION

Double Patenting

3. Claim 1 is rejected under the judicially created doctrine of double patenting over claim 1 of U. S. Patent No. 6,662,224 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: forming at least one set of terminals for possible data transmission for each of a plurality of frequency bands, wherein each set includes one or more terminals and corresponds to a hypothesis to be evaluated (see claim 1, U.S.Patent No. 6,662,224 or Application No.09/859,345); evaluating the performance of each hypothesis (see claim 1, U.S.Patent No. 6,662,224 or Application No.09/859,345); selecting one hypothesis for each frequency band based on the evaluated performance (see claim 1, U.S.Patent No. 6,662,224 or Application No.09/859,345); scheduling the one or more terminal in each selected hypothesis for data transmission on the corresponding frequency band (see claim 1, U.S.Patent No. 6,662,224 or Application No.09/859,345).

However, Walcon (6,662,024) is silent to discloses selecting and scheduling the one or more terminals in each selected hypothesis for data transmission on the corresponding frequency band.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of claim 1 to provide selecting in order to allocate resource or bandwidth to MINO terminals in a MIMO system. Therefore, it would have been able the system of claim 1 to provide high system performance.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

4. Claim 44 is rejected under the judicially created doctrine of double patenting over claim 28 of U. S. Patent No. 6,662,224 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: forming at least one set of terminals for possible data transmission for each of a plurality of frequency bands, wherein each set includes one or more terminals and corresponds to a hypothesis to be evaluated, (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); forming one or more sub-hypothesis for each hypothesis, wherein each sub-hypothesis corresponds to specific assignments of a plurality of transmit antennas to the one or more terminal in the hypothesis (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); evaluating the performance of each sub-hypothesis (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); selecting one sub-hypothesis for each

frequency band based on the evaluated performance (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); scheduling the or more terminal each selecting sub-hypothesis for downlink data transmission on the corresponding frequency band (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345);

However, Walton et al. (6,662,024) is silent to disclosing each frequency band corresponds to a respective group of one or more frequency subchannels.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the claim 44 to provide each frequency band corresponds to a respective group of one or more frequency subchannels in order to allocate resource or bandwidth to MINO terminals in a MIMO system. Therefore, it would have been able the system of claim 44 to provide high system performance.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

5. Claim 47 is rejected under the judicially created doctrine of double patenting over claim 28 of U. S. Patent No. 6,662,224 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: forming at least one set of terminals for possible data transmission, wherein each set includes one or more terminals and corresponds to

a hypothesis to be evaluated (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); evaluating the performance of each sub-hypothesis based on the channel response matrix (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); selecting one sub-hypothesis for each frequency band based on the evaluated performance (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); scheduling the or more terminal each selecting sub-hypothesis for downlink data transmission on the corresponding frequency band (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345);

However, Walton et al. is silent to disclosing forming a channel response matrix for the plurality of terminals in each hypothesis.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the claim 47 to provide forming a channel response matrix for the plurality of terminals in each response in order to allocate resource or bandwidth to MINO terminals in a MIMO system. Therefore, it would have been able the system of claim 47 to provide high system performance.

6. Claim 48 is rejected under the judicially created doctrine of double patenting over claim 28 of U. S. Patent No. 6,662,224 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: forming at least one set of terminals for possible data transmission, wherein each set includes one or more terminals and corresponds to

a hypothesis to be evaluated (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); forming one or more sub-hypothesis for each hypothesis, wherein each sub-hypothesis corresponding to a specific ordering of the one or more terminals in the hypothesis (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); evaluating the performance of each sub-hypothesis based on the channel response matrix (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); selecting one sub-hypothesis for each frequency band based on the evaluated performance (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345); scheduling the or more terminal each selecting sub-hypothesis for downlink data transmission on the corresponding frequency band (see claim 28, U.S.Patent No. 6,662,224 or Application No.09/859,345);

However, Walton (6,662,024) is silent to disclosing each frequency band corresponds to a respective group of one or more frequency subchannels.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of claim 48 to provide each frequency band corresponds to a respective group of one or more frequency subchannels in order to allocate resource or bandwidth to MINO terminals in a MIMO system. Therefore, it would have been able the system of claim 48 to provide high system performance.

7. Claims 52, 53, 54 are rejected under the judicially created doctrine of double patenting over claim 1, claim 4 of U. S. Patent No. 6,662,224 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: forming a channel response matrix for the plurality of terminals in each hypothesis (see claim 1, U.S.Patent No. 6,662,224 or Application No.09/859,345); evaluating the performance of each sub-hypothesis based on the channel response matrix (see claim 1, U.S.Patent No. 6,662,224 or Application No.09/859,345); selecting one sub-hypothesis for each frequency band based on the evaluated performance (see claim 1, U.S.Patent No. 6,662,224 or Application No.09/859,345); scheduling the or more terminal each selecting sub-hypothesis for downlink data transmission on the corresponding frequency band (see claim 1, U.S.Patent No. 6,662,224 or Application No.09/859,345); receiving channel state information (CSI) indicative of channel estimated for a plurality of terminal in a wireless communication system (see claim 4, U.S.Patent No. 6,662,224 or Application No.09/859,345);

However, Walton (6,662,204) is silent to disclosing the select and schedule the or more terminals in each selected hypothesis for data transmission on the corresponding frequency band.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of claims 52, 53, 54 to provide select and schedule the or more terminals in each selected hypothesis for data transmission on the corresponding frequency band in order to allocate resource or bandwidth to MINO

terminals in a MIMO system. Therefore, it would have been able the system of claim 48 to provide high system performance.

8. Claim 58 is rejected under the judicially created doctrine of double patenting over claim 28 of U. S. Patent No. 6,662,224 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: a scheduler operative to receive channel state information (CSI) indicative of channel estimates for a plurality of terminals in the communication system, select a set of one or more terminals for data transmission for each of a plurality of frequency bands, and assign the one or more terminals in each selected set with a plurality of spatial subchannels in the corresponding frequency band (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345); a transmit data processor operative to receive and process data to provide a plurality of data streams for transmission to one or more scheduled terminals, wherein the data is processed based on the channel state information for the one or more scheduled terminals (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345); at least one modulator operative to process the plurality of data streams to provide a plurality of modulated signals (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345);

However, Walton (6,662,204) is silent to disclosing a plurality of antennas configured to receive and transmit the plurality of modulated signals to the one or more scheduled terminals.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of claim 58 to provide a plurality of antennas configured to receive and transmit the plurality of modulated signals to the one or more scheduled terminals in order to allocate resource or bandwidth to MINO terminals in a MIMO system. Therefore, it would have been able the system of claim 48 to provide high system performance.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

1. Claim 63 is rejected under the judicially created doctrine of double patenting over claim 35 of U. S. Patent No. 6,662,224 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: a plurality of antennas, each antenna configured to receive a plurality of transmitted signals and to provide a respective received signal (see claim 35, U.S.Patent No. 6,662,224 or Application No.09/859,345); a plurality of front-end units, each front-end unit operative to process a respective received signal to

provide a corresponding stream of samples, and to derive channel state information (CSI) for a plurality of sample streams (see claim 35, U.S.Patent No. 6,662,224 or Application No.09/859,345); a receive processor operative to process the plurality of sample streams from the plurality of front-end units to provide one or more decoded data streams (see claim 35, U.S.Patent No. 6,662,224 or Application No.09/859,345); a transmit data processor operative to process the channel state information for transmission (see claim 35, U.S.Patent No. 6,662,224 or Application No.09/859,345); wherein the terminal is one of one or more terminals included in a set scheduled for data transmission via one or more of a plurality of frequency bands for a particular time interval (see claim 35, U.S.Patent No. 6,662,224 or Application No.09/859,345);

However, Walton is silent to disclosing wherein the terminal is one of one or more terminals included in a set selected and scheduled for data transmission via one or more of a plurality of frequency bands for a particular time interval.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of claim 63 to provide wherein the terminal is one of one or more terminals included in a set selected and scheduled for data transmission via one or more of a plurality of frequency bands for a particular time interval in order to allocate resource or bandwidth to MINO terminals in a MIMO system. Therefore, it would have been able the system of claim 48 to provide high system performance.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of

the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

2. Claim 62 is rejected under the judicially created doctrine of double patenting over claim 31 of U. S. Patent No. 6,662,224 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: for receiving channel state information (CSI) indicative of channel estimate for plurality of terminals in the communication system (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345); selecting a set of one or more terminals in each selected set with a plurality of special subchannels in the corresponding frequency band (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345); assigning the one or more terminals in each selected set with a plurality of special subchannels in the corresponding frequency band (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345); processing data to provide a plurality of data streams for transmission to one or more scheduled terminals, wherein the data is processed based on the channel state information for the one or more scheduled terminals (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345); processing the plurality of data streams to provide a plurality of modulated signals (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345);

However, Walton (6,662,204) is silent to disclosing transmitting the plurality of modulated signals to the one or more scheduled terminals.

It would have been obvious to one ordinary skill in the art at the time of the invention to modify the system of claim 62 to provide transmitting the plurality of modulated signals to the one or more scheduled terminals in order to allocate resource or bandwidth to MINO terminals in a MIMO system. Therefore, it would have been able the system of claim 48 to provide high system performance.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

3. Claim 65 is rejected under the judicially created doctrine of double patenting over claim 31 of U. S. Patent No. 6,662,224 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: a scheduler operative to receive channel state information (CSI) indicative of channel estimates for a plurality of terminals in the communication system, select a set of one or more terminals for data transmission for each of a plurality of frequency bands, and assign the one or more terminals in each selected set with a plurality of spatial subchannels in the corresponding frequency band (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345); a base station

operative to process transmissions for one or more terminals scheduled for data transmission on the plurality of special subchannels of the plurality of frequency band (see claim 31, U.S.Patent No. 6,662,224 or Application No.09/859,345);

However, Walton (6,662,204) is silent to disclosing a plurality of terminals, each terminal operative to communicate with the base station via one or more special subchannels of one or more frequency bands assigned to the terminal when scheduled for data transmission by the scheduler.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of claim 65 to provide a plurality of terminals, each terminal operative to communicate with the base station via one or more special subchannels of one or more frequency bands assigned to the terminal when scheduled for data transmission by the scheduler in order to allocate resource or bandwidth to MINO terminals in a MIMO system. Therefore, it would have been able the system of claim 48 to provide high system performance.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHUONG T HO whose telephone number is (571) 272-3133. The examiner can normally be reached on 8:00 am to 4:00 pm.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

03/06/05